BULLETIN *of The* BUSINESS HISTORICAL SOCIETY

INCORPORATED

Vol. XX, No. 4 October, 1946 *Whole No. 121*

THE PRE-INDUSTRIAL REVOLUTION IN AMERICA: A FIELD FOR LOCAL RESEARCH 103

GEORGE S. GIBB

THE THREE GOLDEN BALLS OF THE PAWNBROKERS 117

RAYMOND DE ROOVER

QUESTIONS AND ANSWERS 124

N. S. B. GRAS

BUSINESS HISTORICAL SOCIETY, INC.

Organized in 1925 to promote the study
of business enterprise
from an historical point of view

Officers

JOHN W. HIGGINS, *President*
N. S. B. GRAS, *Vice-President*
ALLAN FORBES, *Treasurer*
ARTHUR H. COLE, *Librarian*
THOMAS R. NAVIN, JR.
Executive Secretary and Clerk
ELSIE H. BISHOP
Assistant Executive Secretary

Members of the Council

CHARLES FRANCIS ADAMS
DONALD K. DAVID
WALLACE B. DONHAM
N. S. B. GRAS
JOHN W. HIGGINS
JOHN C. KILEY
HENRY L. SHATTUCK

The Society collects business manuscripts, books, and reports, distributes publications, and otherwise promotes research; the Harvard Graduate School of Business Administration furnishes space and also assistance from the members of its faculty and staff. The Harvard Business School Associates receive all the publications of the Society.

BULLETIN OF THE BUSINESS HISTORICAL SOCIETY, INC.

HENRIETTA M. LARSON
Editor

ELSIE H. BISHOP
Assistant Editor

Issued six times a year and sent free to members of the Society.

For further information concerning the Society or the Bulletin, address The Business Historical Society, Soldiers Field, Boston 63, Mass.

Copyright, 1946, by The Business Historical Society, Inc.

PRINTED IN U.S.A.

The Pre-Industrial Revolution in America

A Field for Local Research

It was the topography of a trout stream which first set my thoughts in the direction of local business history, and then led to broader fields of research. Mill ponds and crumbling masonry are more or less traditional parts of the New England landscape. I should be willing to pass them over with the customary casual notice, were it not that increasing familiarity with some of Massachusetts' "backwoods" country began to reveal what looked like a remarkable pattern of local development. There was a positively idyllic stage of research when, with fly rod in hand, I examined the dams and sluiceways on half a dozen local streams, and pondered the archeological evidences of antique industry. Many questions came to mind. Too early for a place in the Industrial Revolution, too numerous to fit neatly into the colonial-agrarian pattern — what system of economy did these ruins represent? Might they not stand apart, a system of their own, drawing from the earlier and nourishing the later? The phase of inquiry succeeding superficial curiosity led to local libraries and county records. It seemed wise to concentrate initial research efforts in one area, and on one representative watercourse.

The flat and well-watered plains of southeastern Massachusetts are crisscrossed by highways and dotted with towns and cities, but somehow the pattern of urbanization has left surprising gaps. In the counties of Plymouth and Bristol may be found many by-passed pockets, where even the dense stands of scrub oak have not quite obliterated the remains of that struggling civilization which was a center of New England colonization. Over a century ago farmers in this area began to despair at their perennial harvest of rocks, and mill dams fell into disrepair as the course of industrialization led elsewhere. Deer and fox and partridge have returned to many of the scenes of early manufacturing effort. On the western margin of these coastal plains, and roughly halving Bristol county on a

north and south axis, runs a winding, swampy stream typical in almost every way of the watercourses of this region.

The long and gently inclined valley of the Coweset is rich in history, but much of the soil is sandy and supports few farms. There are no great falls, and the stream in its natural course scarcely exceeds two rods in width. The valley is not now heavily populated, nor has it been since colonial times. There are neighboring towns and cities, but these have manufacturing water of their own. No important trade routes pass here, and it requires but little imagination to visualize the inaccessibility of most of the valley in early times, when the winding dirt roads were in the clutch of snow and ice and mud. Yet this stream, possessing so few natural advantages, has mill ponds strung up and down its length. In certain reaches of the stream the eddies of one old raceway scarcely subside into natural flowage before encountering the backwater of a mill pond below. Throughout its length this valley, even in its more remote sections, presents prolific evidence of manufacturing enterprise. This is not an isolated phenomenon. These are characteristics shared by most of the streams of the coastal plain here — streams often so small that even navigation by canoe is difficult — streams where mill dams bridge every natural constriction of the banks and where the count of mill sites often runs as high as ten or a dozen to the mile. Perhaps these ruins considered individually do have only antiquarian interest. Might it not be, however, that the broader story of the hundreds of small enterprises has a deeper significance to business history and economic history than previously attached to it? I feel that, in the haste to label eighteenth century America a mercantile and an agricultural economy, vital mechanical skills and accomplishments have been slighted. There are important industrial origins to be found in these early ventures, not only in the Massachusetts area to which I have pointed for illustrative purposes, but throughout the entire country.

The old school textbooks said that the Industrial Revolution came from England to America with Samuel Slater in 1789, and became important to American life with the mushroom growth of the textile factories after 1807. Modern historians, becoming more liberal and less definite, shrink from assigning single origins to great economic movements. My thesis is that vastly significant industrial development had occurred in America before Samuel Slater was born.

The American Industrial Revolution was a huge and potent thing, but vague in outline and differently defined by different historians. Was it the factory system — the gathering together of productive tools and specialized labor under a few large roofs? Certainly this was a part of it, and the part that has been heavily emphasized. Methods of business administration new to America were involved. Political action was a vital factor in the development. The mercantile world furnished both capital and management for domestic manufactures, and names like Moses Brown, Nathan Appleton, and Francis Lowell became intimately associated with the rapid growth of industry. Inventive genius and mechanical skill are also intimately associated with the movement, but these latter are popularly conceived to be English virtues, imported in the closing years of the eighteenth century. It is at this point that my concept of origins parts with tradition.

Samuel Slater began, in the spring of 1790, to put together machinery for the first successful and profitable attempt in America to spin yarn by water power. Admittedly, this activity in the old fulling mill at Pawtucket bridge was tremendously significant and a proper point for strong historical emphasis. What is frequently — or even usually — omitted from the record, however, is the fact that Slater did not work alone. Without skillful and practical assistants Slater might well have failed. It is important that we consider who these men were who helped him translate his knowledge of the Arkwright patents into working reality.

One was Pliny Earle, a hand-card maker of Leicester, Massachusetts, who, though unfamiliar with the Arkwright power-driven machinery, nevertheless corrected a serious defect in one of Slater's machines. Another was David Wilkinson, a native Rhode Islander, son of an ingenious blacksmith, and a Yankee mechanic of genius in his own right. Moses Brown, Slater's patron, makes significant reference to "mechanics skilled in working of wood, iron, brass, etc., etc.,"[1] and White, Slater's biographer, states that ". . . it appears, that at the commencement of the manufacturing business, Mr. Slater was under the necessity of hiring mechanics, or workmen, in iron and wood, of the then common trades of the country. . . ."[2]

---

[1]George S. White, *Memoir of Samuel Slater* (Philadelphia, 1836), p. 85.
[2]*Ibid.*, p. 106.

America's eighteenth-century manufacturing techniques were crude, and there was little of the precision and few of the power tools which were later to come. Nevertheless, long before there were factories there were tools and the men who could use them to build power-driven machinery. The factories of the early nineteenth century were a distinct departure from the progenitor mills and workshops in organization, but the Industrial Revolution in its infancy produced surprisingly few technical skills not already familiar to American mechanics. So numerous and diversified were the manufacturing enterprises which existed in the heart of our mercantile-agricultural economy, and so full of portent for future industrial development were the many skills of American mechanics that there is much justification for grouping these activities and skills under some such label as "Pre-Industrial Revolution," rather than considering them as scattered by-products of colonial life. The briefest of surveys suffices to reveal the extent and variety of the beginnings of American manufacture, and this, coupled with an examination of processes and skills, reveals the potent influence which the Pre-Industrial Revolution exerted on succeeding generations of mechanics.

The general pattern of manufacturing development from earliest colonial times is not hard to follow. The colonists in Virginia, Plymouth, and elsewhere recognized that they could not support life with imports from the mother country. They began to manufacture almost immediately. The first products in Virginia — pitch, tar, glass, and soap ashes — were a joint result of local need and the necessity of providing a return to the English promoters of the colony. Diversification of effort appeared as men of many skills migrated to the New World, and colonial manufactures expanded both in size and in kind with the growing needs of a growing population. Almost from the beginning of colonization, manufacturing effort assumed two distinct but closely related forms — hand crafts and power-driven production.

The manufacture of goods by skilled manual craftsmanship, both in workshop and in homes, became the most prevalent form of manufacture. Most of the finished articles for use and trade — consumers' goods, in modern terminology — were thus manually fabricated. In this form of manufacture great skill was achieved in the handling of material and hand tools, but power, other than that supplied by the craftsman himself, was not usually applied

A typical pre-Industrial Revolution mill still in operation today. In small pond-size enterprises like this, America learned skills which made the Industrial Revolution possible.

to the process. Not until 1790 do we have any statistical information which gives anything like a comprehensive picture of the extent and nature of the crafts, and even from that time on figures appear to fall short of reality. The general histories of American manufactures, as well as various local histories and State documents, however, indicate the imposing array of skills which were being built up. In Boston, as early as 1647, there were said to be six wood-working trades, seven metal-working trades, three forms of leather manufactures, weavers, ropemakers, felt makers and furriers, brickmakers, tilemakers, and minor industries. In Philadelphia at the time of the Revolution we find blacksmiths, tailors, coopers, wheelwrights, shipwrights, hatters, printers, tanners, shoemakers, weavers, cordwainers, saddlers, joiners, button-makers, peruke-makers, breech-makers, millers, stocking-weavers, fullers, dyers, rope-makers, distillers, brewers, maltsters, snuffmakers, tallow-chandlers, leather-cutters, cutlers, gunsmiths, gunpowder-makers, silversmiths, engravers, coach-makers, cabinet-makers, sawmill operators, and lime-burners — and the list is not complete.[3]

Progress in the metal-working trades was particularly important. Cast-iron hollow ware was being made in Massachusetts as early as 1643. In 1742 one small town in that State reported 20 forges in a radius of 12 miles,[4] and in 1786 there were said to be 76 "iron works" in the Commonwealth.[5] By 1790, America, though still importing the finer grades of cutlery from England, was supplying her own needs for domestic utensils, edged tools, and miscellaneous cast iron ware. The significance of this fact lies not in the nature of the products, but in the techniques of manufacture employed. The art of casting was admittedly capable of improvement in 1790, but American mechanics knew how to melt and mold. They had learned the limitations of the tough and brittle native bog ore, and the advantages of imported Russian pig. Machine tools were a development for the future, but manual shaping was skillfully practiced, and men proficient in boring, chipping, and filing were to be found in almost every community. A detailed listing of these

[3]Victor S. Clark, *History of Manufactures in the United States, 1607-1860* (Washington, D. C., 1916), pp. 163-164.

[4]Middleborough, Massachusetts. George F. Dow, *The Arts and Crafts in New England, 1704-1775* (Topsfield, Mass., 1927), p. 266.

[5]Tench Coxe, *A View of the United States of America* (Philadelphia, 1794), p. 144.

handicraft skills could be extended to great length, but this hardly seems necessary in an outline paper of this sort. Victor S. Clark makes this appropriate observation: ". . . a bare enumeration of the trades we know were plied in the colonies indicates that varied and widely diffused handicraft manufactures then existed, in the aggregate contributing largely to colonial production, but chiefly important for the leaven of knowledge, skill, and habit which they supplied for subsequent industrial development."[6]

Manufacture by water, wind, or horse-driven machinery also has early origins, and goes back almost to the founding days of the American colonies. The powered mills have a different significance from that of the handicraft shops mentioned above, but the two often overlap. The stages of fabrication through which some goods, particularly iron-ware, passed encompass both the mill and the shop. In many manufacturing establishments the two systems were to be found side by side under one roof, one supplementing the other. My separate treatment of these correlative processes, therefore, is somewhat artificial.

In comparison with the great numbers and kinds of handicraft shops, the variety of Pre-Industrial Revolution power-driven mills was limited. It is the relics of mills rather than shops, however, that we observe today, in the form of ancient ponds and dams, rubble, and sluiceways. Grist, saw, and fulling mills were integral parts of the early colonial communities. America had all three types by 1643. In 1646 Joseph Jenks, in Lynn, Massachusetts, may possibly have contemplated the use of water power in the metal-working trades when he petitioned to set up "mills to goe with water for ye more speedy dispatch of worke than formerly, and mills for ye making of Sithes and other Edged tools."[7] It was not until a hundred years later, however, that the use of water power by others than millers, sawyers, and fullers became widespread. In 1738 Hugh Orr, of Bridgewater, Massachusetts, set up one of the first trip hammers in the country, and this town and neighboring Easton became leaders in the manufacture of coarse hardware. Water-driven rolling and slitting mills began to be established about this time for the processing of iron for nail making. By 1750 England

[6]Clark, *op. cit.*, p. 164.

[7]James L. Bishop, *History of American Manufactures* (Philadelphia, 1868), vol. i, p. 96.

was sufficiently stirred by the progress of these mills and the prospect of colonial competition with home industry to prohibit the erection of additional slitting or rolling mills, tilt hammers, or steel furnaces. Manufacturing efforts survived restrictions, however, until the time when open revolt cleared the air and lent an impelling urgency to the growth of home manufactures. Paper and gunpowder mills became common during Revolutionary times, and snuff mills soon thereafter. In all these mill types water was the principal motive power, though manual operation was not uncommon, and wind power was utilized in many areas. There were other kinds of mills, and other manufacturing uses to which wind and water were put, but the list presented here covers the most prevalent and significant. The manufacturing processes which could be carried on by power-driven machinery were limited to a scant handful, but there certainly was no such limitation on the numbers of the mills we find in existence in the Pre-Industrial Revolution period. General business history and local history as well give ample notice of their existence since earliest times in every community and on every suitable stream in settled areas.

I have pointed out in preceding paragraphs that the importance of the handicraft shops lay in the fact that in them American artisans became familiar with basic tools and a wide variety of materials. This was also true of the water-driven mills, but the chief importance of the mills was that in them American mechanics learned how to harness natural forces for moving machinery too cumbersome for manual effort. By the end of the eighteenth century America appears to have been as far advanced as any country in the world in the basic applications of water power to mechanical movement, and was on the threshold of undisputed supremacy in the field of practical hydraulics.

The absence of adequate statistical information forbids a comprehensive survey of Pre-Industrial Revolution manufactures. Much may be learned, however, by examining specific communities. Mention has already been made of wide ranges of manufacturing activity in two cities — Boston and Philadelphia. Progressing to the smaller communities, I have chosen two in Massachusetts — Newton and Fall River — for passing examination. Each of these communities is typical of what was to be found in the New England of Pre-Industrial Revolution days. Newton was selected because it represents the early settled, closely integrated village sit-

uated near a large trading center. In such a relatively urban atmosphere we would quite logically expect to find early and rapid development of shops and mills. Fall River is a contrasting example. Though possessing advantages of power and location which were later to promote phenomenal growth, Fall River, in the times under consideration, was a real country village with a strong agricultural tradition.

Newton, Massachusetts, lying within a U-shaped bend of the Charles River, some six miles west of Boston, traces its manufacturing history back almost 300 years.[8] As with all such settlements, the River was its life blood, furnishing as it did the fish for food, the moisture for the fields, and power for the water wheels. In 1688 a sawmill was erected at the so-called "Upper Falls" — on a privilege purchased at an even earlier date from the Indians. In 1704 the water power at the "Lower Falls," two miles downriver, was first put to use and an iron-works, forge, and trip hammer erected there. By 1720 a grist and fulling mill had been added at the Upper Falls, and in 1782 Boston mercantile capital erected a snuff mill at the site. About the same time that the snuff mill was erected, a sawmill was constructed at the "Lower Falls," followed, in 1790, by a paper mill. By 1800 these two manufacturing sites, with a population of 16 or 18 families in the immediate neighborhood, boasted of three snuff mills, a gristmill, a sawmill, a paper mill, a rolling and slitting mill, a tobacco house, a scythe factory, a corn mill, and a fulling mill. Certainly few Newton lads went forth to seek their fortune without a fairly intimate knowledge of water wheels, dams, and shafting!

In Fall River,[9] located on an abrupt elevation of land on the shore of Mount Hope Bay, 19 miles southeast from Providence and

[8]Sources of the Newton material as follows: Orra L. Stone, *History of Massachusetts Industries* (Boston, 1930), vol. i, p. 894; S. A. Drake, *History of Middlesex County* (Boston, 1880), vol. ii, pp. 235-237; Francis Jackson, *A History of the Early Settlement of Newton* (Boston, 1854); S. F. Smith, D.D., *History of Newton, Mass.* (America and Logo Type Co., 1880); Middlesex County Registry of Deeds, deeds 80–26, 27; 84–205; 121–312; 134–401.

[9]Sources of the Fall River material as follows: *Fall River, Its Rise and Progress, 1803-1875*, B. Earle & Son, Fall River, 1875; H. H. Earl, *Centennial History of Fall River, Mass.* (N. Y., 1877); *Map of Fall River about 1800*, prepared from data from various sources to accompany report of Watuppa Ponds and Quequedian River Commission, 1915.

52 miles south of Boston, men looked to their fields rather than to the trade which passed down the channel in their front yards. So remote and unpromising was this site, in colonial days, that three families comprised the backbone of population, and in 1800 the number of inhabitants recorded there was less than 100. Yet even here the inevitable beginnings of manufacturing skills may be traced. As early as 1691 a significant reference in local deeds is made to the water powers of the place. In 1703 a gristmill, a sawmill, and a fulling mill were erected, and midway in the century there were two sawmills, two gristmills, and a fulling mill. Local history notes an expedition by British soldiers from Newport, in 1778, aimed at the destruction of these enterprises. By 1800 this village was providing work for four blacksmith shops, two sawmills, and a gristmill.

Every New England community, no matter how isolated, had its artisans and its waterwheels. Though the fact of their great variety and number is significant in itself, a quantitative examination is not enough. The Pre-Industrial Revolution fostered not only universal mechanical skill, but certain specific and very important mechanical inventions. Most of these had English origins, but were adapted to American conditions and improved by American ingenuity. A careful examination of our first factories reveals the fact that much of the equipment which we associate with the era of Industrial Revolution has earlier origins.

The overshot, undershot, breast, and pitch-back wheels used to motivate the first factories had long been known to American wheelwrights. Even the turbine, which effected a revolution in power systems of the nineteenth century, was anticipated in the form of the colonial tub wheel. Skill in converting weight and force of water into the basic mechanical motions by means of gearing and shafting had been achieved in the seventeenth century. The rotary action of heavy members was first learned in the gristmills, where the weight of the stones also promoted a knowledge of heavy shafting. Reciprocating motion was the basis of the gate or sash sawmills. In these mills the saw was attached at top and bottom to a heavy wooden frame, which slid up and down between vertical guide posts. The reciprocating motion was imparted to the frame by a connecting rod, the lever end of which extended to one end of the waterwheel shaft. In the fulling mills the principles of piston action were worked out, and millwrights learned to communicate the rotary waterwheel motion by means of a geared

spindle to the pestles or stampers which pounded the cloth. Gunpowder and snuff mills later applied this principle of gearing and refined it to meet their more measured requirements. In the earlier mills it appears that only one piece of machinery could be powered by a waterwheel. By the time of the Revolutionary War, however, mechanics had learned to drive several pieces of apparatus from one power source.[10] This knowledge was a basic part of the factory system of production which was to come.

The introduction of the trip hammer early in the eighteenth century prepared the way for that rapid production of metal shapes which has come to be associated so closely with the Industrial Revolution. These hammers, driven by waterwheels, replaced one of the blacksmith's arms — the arm which wielded the sledge. The other arm was still necessary to guide the work. Still, compared with what had gone before, this was automatic operation. Production of bars and plates, hoops, bolts, scythes, and other simple forms was greatly accelerated.

The rolling mills of the middle eighteenth century were small in size, but the process of rolling bar iron into sheets of predetermined thickness was first learned here, and not in the factories of the following century. One invention which has been intimately associated with Samuel Slater and the Industrial Revolution is the system of differential gearing which, though utilizing but one source of power, permits one member of a machine to rotate faster than another. This principle formed the basis of Sir Richard Arkwright's most important spinning patents, and was built into Slater's water frames and cards in 1791. It is worth noting, however, that in one of the earliest rolling mills in this country, set up in Middleborough, Massachusetts, in 1751, a crude but successful attempt was made to permit independent regulation of the speeds of top and bottom rolls.[11]

The 1790's were prolific of invention in many fields. This was the borderline period between Pre-Industrial and Industrial Revolution. At this point the two begin to lose their separate identities. However, many of the inventions of this decade were made in the small shops — industrial units which, by virtue of their size and organizational make-up, belong more to the earlier period than to the later. One of the Yankee's favorite pastimes was experi-

[10]Clark, *op. cit.*, p. 175.

[11]Transactions of the A. S. M. E., 1881, vol. ii, p. 104.

menting with gadgets to make tacks and nails. Not all of these were water-driven, but by 1790 a number of effective machines had been developed. The intricacy of these devices was graphic testimony to the progress of mechanical skill. The same holds true of the manufacture of hand cards for combing wool and flax. The needle-like teeth for these cards were once set in leather or wood by hand, a laborious and costly process which yielded in the early 1790's, and perhaps before, to machines which pricked the leather and cut, bent, and set the teeth.[12] Considerably earlier than this time a very efficient machine was devised for cutting the teeth and which turned them out at a rate of 1500 per minute.[13]

The Pre-Industrial Revolution not only produced most of the skills which were prerequisites for the ensuing era, but fostered the beginnings of technical education and the emergence of a professional class of practical men of science. In 1795 Oliver Evans brought forth America's first mechanical textbook, *The Young Mill-Wrights and Millers Guide*. This book contains valuable evidence of the advanced state of mechanical theory and practice, but of much greater interest is the fact that here the two are brought together in working unity. In the preface Evans states:

> The reason why a book of this kind although so much wanting did not sooner appear, may be — because they who have been versed in science and literature, have not had practice and experience in the arts; and they who have had practice and experimental knowledge, have not had time to acquire science and theory. . . .

It may well be that this alliance of scientific theory with the workbench skills overshadows in importance all other achievements of the Pre-Industrial Revolution period.

Colonial life fostered practical instincts, and the cumulative effect of several generations of mechanical tinkering was large in terms of subsequent technical progress. Men lived close to the land in the villages, and even in the largest towns ability to work with one's hands was a common characteristic of large segments of the population. Bishop states that even before the adoption of the Federal Constitution a varied and dextrous mechanical industry was all but universal.[14] It was a fact of great significance that in America at the close of the eighteenth century a competent

[12]Bishop, *op. cit.*, vol. i, p. 388.

[13]*Ibid.*

[14]*Ibid.*, vol. ii, p. 13.

observer could say, ". . . all the citizens are in active habits."[15] Most mercantile fortunes were in their first generation, and the doughty merchants of Boston and Salem had not been so long in their counting houses as to have lost touch with the practical mechanics of their calling. The idle rich as a class did not exist. Even professional men were close to basic realities. Country ministers preached the Gospel on Sunday and built houses or shoed horses on week-days. It is to be presumed that even scholars at Harvard College could milk a cow.

That Samuel Slater, in 1790, could find skillful native mechanics to assist him — men who, after short acquaintance with his machines, were able to reproduce and improve them unassisted — is attributable to the practical character of the population and the training of these men and their forbears in the workshops and mills of colonial America. Here working skills were built up which made the Industrial Revolution possible and the transition to an industrial economy rapid. The importation of key English inventions in the closing years of the eighteenth century acted as a catalyst, giving fresh motion and new direction to the tremendous forces of existing native genius.

* * * * * * * *

In endeavoring to point out a general pattern in this article I have passed by many individually promising subjects for detailed research. It is only by a large number of detailed studies that all the importance of the Pre-Industrial Revolution can be revealed. This is a field for the amateur historian interested in the industrial background of his own community. Thousands of general references to early manufacturing enterprise exist. There are almost no detailed accounts. Much of the story has been irretrievably lost, for even where records were maintained they have long since disappeared. Some of this history might be salvaged, however. Assuming the absence of business records, still such questions as these might be answered by a reasonably fortunate and diligent researcher. With relation to one mill site: What were the enterprises carried on there? Who were the founders, and what was their background? What tools or machines were used and what range of products made? If the possibilities for research afforded by one enterprise or one site appear limited, a profitable study might be undertaken of several, related either by location or kind. In

[15]Coxe, *op. cit.*, p. 441.

the latter case research emphasis should be placed on discovering the importance of manufacturing effort in relation to the agriculture, trade, population, and resources of the community involved

It has been suggested that regions other than the Atlantic seaboard offer the best hope for detailed study of early manufactures. In the Middle West and West the span of years back to industrial beginnings is not as long, and the chances of locating data are correspondingly greater. In the later-settled regions the process of development leading from pioneering to Industrial Revolution was accelerated, but the Pre-Industrial Revolution is to be found there in recognizable and fairly accessible form.

A starting point for research on Pre-Industrial Revolution shops and mills would be local published history. Such compilations would provide background material, but would generally be found to be lacking in technical detail. Local deeds and probate records offer the best possibilities. In the times under consideration such legal papers often went into surprising detail. Men were referred to by occupation, their estates and interests often described, and their tools and equipment sometimes carefully inventoried. Occasionally there are to be found early maps which furnish important supplementary information.

The accumulation of all existing data on specific enterprises or small groups of enterprises of the colonial period has seldom been attempted. As in this article, the temptation to generalize and to regroup existing material of a general nature is an overwhelming one. There is a need here for factual material of a more detailed, concentrated, and original nature. We should like to know more about these early shops and mechanics, and more about their relation to nineteenth and twentieth century industry. Most of these first manufacturing endeavors perished with the changing times. Others achieved immortality of a kind by furnishing a great man to industry. Some of them mastered the transition to factory techniques and grew great, while others survived the transition and perpetuated the form, if not the substance, of petty capitalist enterprise to the present day. They merit historical notice both as progenitors and as components of modern manufacturing industry.

George S. Gibb,
Department of Business History,
Harvard Graduate School of Business Administration.

The Three Golden Balls of the Pawnbrokers

The accompanying picture of a pawnbroker's shop and sign was taken in Boston in 1946. The sign of the three balls is a common sight in the poorer sections of many American cities, and its meaning is always the same: the balls signify that within the shop loans may be obtained on the pledge of personal property. This type of loan is centuries old: it existed in ancient Greece at the time of Pericles and in ancient Rome at the time of Augustus. Professional money-lenders, either Jews or Lombards, reappeared in the Middle Ages, and their activities elicited the opposition of the Church and the hatred of the populace. Attempts to get rid of the Jewish or Lombard[1] pawnbrokers were repeatedly made, but the result was always the same: the need of consumers for credit accommodation was so great that the money-lenders were usually recalled after a short while.

Medieval pawnbrokers were granted licenses by the public authorities. In many countries of continental Europe and Latin America, the license system has been abolished and the private pawnbrokers have been replaced by public loan offices called *monts-de-piété*. However, the medieval license system has been preserved in Great Britain and the United States.

The character of the private pawnbroking business has changed little in the course of centuries. Pawnbrokers have been able to operate profitably only when they were allowed to charge interest at a rate greatly in excess of that on commercial loans. In the Middle Ages the permissible rate was often 2d. per £ a week, or 43⅓ per cent a year. Today, the legal rate which pawnbrokers are allowed to charge is as high as 3½ per cent a month, or 42 per cent a year, in several States of the Union and Hawaii; 3 and 36 per cent in Massachusetts, Ohio, and Illinois; and 2½ and 30 per cent in New York.

---

[1]While "lombards" is used to designate pawnbrokers in general, when capitalized it refers to those who came from Lombardy.

There are other constants in the pawnbroking business, and it would be possible to write an interesting comparative study on the subject. The purpose of this article is more limited, however. It deals only with the sign of the Three Balls.

What is its origin? Attempts to answer this question have given rise to many fairy tales, but no one has succeeded as yet in providing a rational explanation.

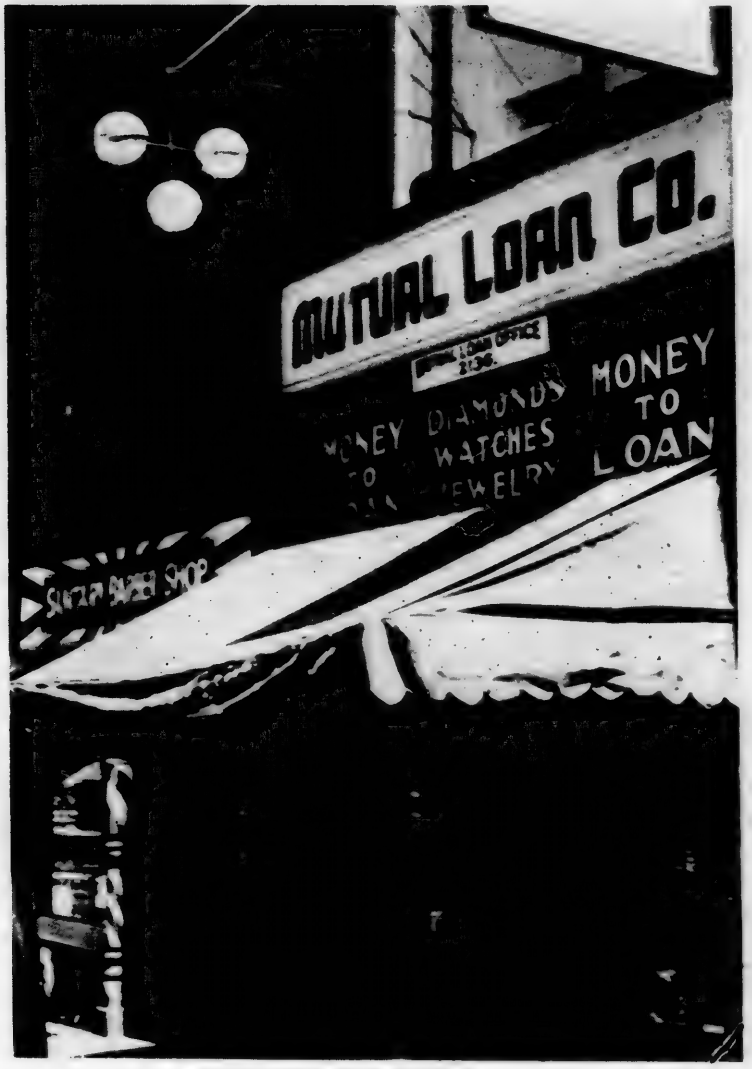
According to one legend, the three balls are linked to St. Nicholas, who endowed the three daughters of an impoverished nobleman by tossing three purses full of gold coins into the maidens' room. The three balls are said to represent the three purses of St. Nicholas.[2]

It is true that in religious paintings St. Nicholas is frequently represented with three purses, three balls, or three bezants. Sometimes these are placed at his feet; sometimes they are shown lying on a book which the saint holds in his hand. The Christian art of the Middle Ages was symbolic. One may, therefore, draw the conclusion that three balls are a symbol of money in medieval art. As we shall see, the same is true in heraldry.

Even after this important point has been established one still has to prove that there is a link between St. Nicholas and the pawnbrokers. Could St. Nicholas have been their patron saint? The trouble with this suggestion is that the Church considered pawnbrokers as common or "manifest" usurers. As such, they were not entitled to the protection of a patron saint. In the Middle Ages, usurers were cast out of the communion of saints, and, consequently, could not benefit from the intercession of a heavenly patron. Pawnbrokers, being public usurers and sinners, were excommunicated and could be saved only by renouncing the practice of usury, confessing their sins, and making restitution of all their ill-gotten wealth. To claim St. Nicholas as the protector of usurers would be inconsistent with the theology of the Roman Catholic Church. One must conclude that there is no ascertainable link between the three balls of St. Nicholas and those of the pawnbrokers, apart from the fact that in both cases the balls represent money.

Another explanation tries to establish a connection between the three balls of the pawnbrokers and the three purses which appear

[2]Alfred Hardaker, *A Brief History of Pawnbroking* (London, 1892), pp. 6 f.



A Pawnshop in the Boston Area Today

in the coat of arms of the Flemish family van der Beurse.[3] As is well known, a stock, or commodity, exchange is called *beurs* in Flemish and Dutch, *bourse* in French, and *Börse* in German. There is no doubt about the etymology of this word. It came to designate any meeting-place of merchants, because in medieval Bruges the Italian merchant-bankers used to assemble every day on the Place de la Bourse or the public square in front of the mansion of the van der Beurse family.

While these facts are not in dispute, they do not prove that there is necessarily any connection between the three balls of the pawnbrokers and the three purses of the van der Beurse coat of arms. First of all, the members of this family were prominent as bill, and commission, brokers but are never mentioned as being pawnbrokers. As for the Italian merchant-bankers who met daily on the Place de la Bourse, they dealt in bills of exchange, but there is no evidence that they lent money on pawns. The establishment of the Italian pawnbrokers, or "lombards," of Bruges was not located on or near the Place de la Bourse but in another part of town, behind the choir of the Church of St. Gilles. Consequently there is no connection, however remote, between the three balls and the van der Beurse family.

Many popular writers have traced the origin of the three balls of the pawnbrokers to the balls, or *palle*, of the Medici coat of arms. It has been asserted, without evidence of course, that the former were derived directly from the latter. The existence of such direct connection is rather doubtful, if one considers that the Medici were not pawnbrokers but international merchant-bankers who combined foreign trade with dealings in bills of exchange. It must be conceded, however, that there is an indirect relation between the balls of the pawnbrokers and those of the Medici, because careful investigation apparently shows that both have a common origin in medieval heraldry.

First of all, there is no basis for the belief that the arms of the Medici are so-called "canting arms," or *armes parlantes*. According to sixteenth-century genealogists the balls supposedly represent pills, because "Medici" is the plural of *medico*, "physician," in Italian. Modern historians have branded this theory as a fairy tale which was possibly invented by the enemies of Catherine de'

[3]The arms of this family were: or, on a bend gules, three purses argent.

Medici, Queen of France, or which was brought into circulation (in the period of the Renaissance) by men of letters, who loved to play with the meaning of words.

It is much more likely that the Medici coat of arms is derived from that of the Florentine Money-Changers' Gild, the *Arte del Cambio*. The emblem of this gild was a red shield sown with gold roundels, or bezants (from the name of a Byzantine gold coin). Members of the Medici family are listed as belonging to the *Arte del Cambio* from an early date. It is probable, therefore, that the Medici adopted as armorial bearings the emblem of the gild to which several members of the family belonged. However, armorial bearings are not usually taken over without modification. In this case the colors were reversed, since the Medici bore red roundels on gold instead of gold roundels on red as in the arms of the Money Changers' Gild.

In the beginning the Medici coat of arms was presumably a field of gold sprinkled with numerous torteaux, or red roundels, but their number was gradually reduced from eleven in the fourteenth century to six at the time of Lorenzo the Magnificent. Giovanni di Bicci, Cosimo's father, carried eight torteaux in his coat of arms. Cosimo, when he became the head of the family, retained only seven, as can be seen on the blazon carved in stone at one of the corners of the Medici palace in Florence. Piero, Cosimo's son, did not alter the number of the balls, but obtained from Louis XI in 1465 the right to display the fleurs-de-lis of France as an augmentation to the armorial bearings of the Medici family. As a result of this grant, the color of the uppermost roundel was changed from gules, or red, to azure on which were placed three golden fleurs-de-lis. Finally, Lorenzo the Magnificent reduced the number of roundels to six, at which figure it remained.[4]

Roundels, or balls, are a common charge, not only in Italian but also in French and English heraldry. Their presence in a coat of arms may have a variety of meanings, but the bezant (or gold roundel) and the plate (or silver roundel) are often the heraldic representation of money. The coat of arms of the *Arte del Cambio* is one good example. Another excellent example is the coat of arms granted in 1701 to the Bank of Scotland.[5]

[4]G. F. Young, *The Medici* (New York, 1930), chap. vi, pp. 134 f.

[5]Arthur Charles Fox Davies, *The Art of Heraldry: an Encyclopedia of Armory* (London, 1904), p. 446.

In this coat of arms we find the St. Andrew's cross in white on a blue ground (the emblem of Scotland) between four bezants, the latter an obvious reference to the financial character of the institution.

The Medici are not the only family of bankers bearing roundels. I know of a much more recent example, that of Louis van de Put, an Antwerp stockbroker and banker, who was very successful in business and eventually became the president of the Banque de

COAT OF ARMS OF BARON VAN DE PUT.
ANTWERP STOCKBROKER AND BANKER
Parted per fess, argent and sable,
an eagle displayed counter-changed,
three pellets in chief, and three plates in base.

Commerce, one of the principal commercial banks in that city. This banker, after being created a Roman count by the pope, received in 1927 a baron's title from the King of the Belgians. The new nobleman adopted a coat of arms bearing an eagle between six roundels: three pellets, or black roundels, above and three plates, or silver roundels, below. The roundels are probably an allusion to banking, although Pope Pius XI, who granted the title of count to van de Put, also had a coat of arms bearing an eagle and three roundels.[6] The pope certainly was not a banker and still less a pawnbroker! Perhaps in Baron van de Put's case the roundels have a double meaning: they may refer both to finance and to the papal grant.

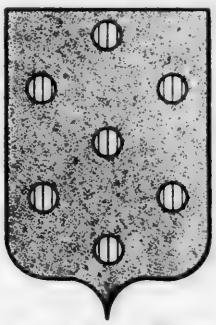
It may be, as some claim, that a shield bearing a gold chevron between three bezants was first displayed as a sign above the

[6]The arms of Pius XI were: parted per fess, or and argent, in chief an eagle displayed sable, and in base three torteaux.

Balls or Roundels as a Symbol of the Money-lenders

Coat of Arms of the Arte del Cambio in Florence

Gules, semée of bezants.



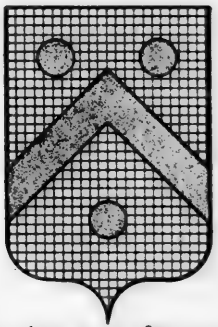
Coat of Arms of the Medici Family in Cosimo's Time

Or, seven torteaux, five in saltire, one in chief and one in base.

Merchant Mark of the Medici Bank

Coat of Arms of the Bank of Scotland

Azure, a saltire argent between four bezants.



Coat of Arms of the Pawnbrokers in Great Britain

Sable, a chevron or between three bezants.

door of an Italian pawnshop in Lombard Street. On the basis of this precedent the Trade Association of Pawnbrokers in Great Britain claims that it is entitled to a coat of arms bearing, on a field of sable, a chevron or, between three bezants. Under the escutcheon is placed a scroll with the motto: *Sub hoc signo floresco* ("Under this sign I flourish"). Regardless of the validity of these pretensions, it is quite certain that the sign of the three balls is not of recent date. It is found in old prints picturing pawnshops and most probably goes back to the Middle Ages. In those times heraldry was a living art whose symbolism was understood by the common people. In heraldry, money is often represented by balls or disks, especially of gold or silver. It is, therefore, not surprising that the pawnbrokers adopted a sign with balls, since these were the symbols of money and were associated in the public mind with banking and other forms of money-lending. *Three* balls were probably chosen because in heraldry three is the most common number of charges on the escutcheon.

RAYMOND DE ROOVER,
Wells College.

Questions and Answers in Business History

When did women enter business?

It was during the first stage of business — that of petty capitalism — in both ancient and mediæval periods. The widows of business men carried on the work of their deceased husbands in shops and stores, employing both apprentices and journeymen.

* * *

Did James Watt invent the steam engine?

No, he merely improved it and adapted it to use in factories. What he did accomplish was done with the support of his business partner, Matthew Boulton.

* * *

What is the oldest department store in the United States?

Probably, the Hager Store in Lancaster, Pa., established in 1821 and now in the fourth generation of the same family with five sons active in the management. One member of the fifth generation has recently begun to work in the store.

When did Boston begin to lose commercially to New York?

It was not later than 1837-57 when the concentration of trade in the city on the Hudson invited Bostonians to establish their selling agencies there. Thus was business policy determined by general circumstances.

* * *

What examples of control do we find in business?

Many and in all stages. Control of apprentices and journeymen by petty capitalists, of agents by mercantile capitalists, of workers in factories by industrial capitalists, of industrial capitalists by financial capitalists, and financial capitalists by national capitalists (politicians and political administrators).

* * *

Whence came the need for business auxiliaries, such as market consultants, management engineers, and counsellors in industrial or public relations?

From the narrow training of industrial capitalists at a time when business was becoming complex.

* * *

What is the meaning of the statement, "Scratch a banker and you'll find a merchant?"

Historically, bankers arose out of mercantile pursuits. When a merchant or a mercantile family grew old, there was a tendency to specialize in private banking.

Theoretically, the banker is a merchant of capital or credit.

* * *

Which came first, the bank or the banker?

Both came into existence in Italy during the Middle Ages. The commercial bank, however, *flourished* only in modern times. In America commercial banks preceded (private) bankers.

* * *

What have been the chief meanings of "factory?"

Seat of a factor or agent, public work house, central workshop, and manufactory equipped with power machinery.

* * *

Has there ever been a house of merchants in our national assemblies?

Originally the house of burgesses resembled this but included middle-class representatives from the countryside. The foreign merchants in England in the thirteenth and fourteenth centuries

acted pretty much as a house of merchants in granting customs duties to the kings.

* * *

What is the first example of an anti-social business practice in New England?

Perhaps Thomas Morton provided the first instance. In 1625 he established his trading post at Merry Mount where guns and liquor were sold to the Indians and where Indian squaws were debauched.

* * *

Why did marine insurance precede all other forms of insurance?

Because it flowed from a clear-cut obvious risk, beyond the control of man, that was of short duration (the period of a terminal venture or voyage).

* * *

What is the inner meaning of capitalism as the term is now used?

The term has propaganda value only. As ordinarily used, it is as inexact as democracy, liberty, rheumatism, and indigestion.

* * *

Where is the origin of capitalism to be found?

Sombart found it in the unearned urban rent turned into foreign trade. Brentano saw it in the heart of man.

More broadly, capitalism may be regarded as the means of gaining a living which arises when capital goods are first used extensively in production. This was certainly not later than in nomadic economy when men had large flocks and herds. It was the head (caput) of cattle that gave us the name capital as it gave us the thing itself — the cattle that produced milk, flesh, and hides as an income for man.

* * *

Is there a psychology of capitalism?

There might be but it is not well developed. Sombart has written volumes which point the way to a study of the mind of the business man. Unfortunately Sombart knew business only at second hand, as an economist, a journalist, and a theorist, but he was a pioneer. Professor Rupert C. Lodge in his *Philosophy of Business* (1945) has written the first scholarly study of the mind and attitudes of the business man.

Which came first, business or capitalism?

Clearly, in its root sense capitalism came first. Business was born only when business men came into being — when towns arose with contracts and the exchange of goods and services.

* * *

Did industrial capitalism arise in manufacture?

Definitely not. When mercantile capitalists, such as the Medici and Fuggers in the fifteenth century, turned from general trade to banking, a beginning was made in the direction of industrial capitalism, that is, the specialization in one or two functions of business carried on in considerable volume.

* * *

Who was our first prominent industrial capitalist?

John Jacob Astor has a strong claim to this distinction. He had been our most successful mercantile capitalist, trading with England, China, and the Northwest Coast. Then he shifted to the real-estate business, which became the foundation of the great fortune which his descendants have enjoyed.

* * *

What is the relation between the Industrial Revolution and industrial capitalism?

Industrial capitalism began in a small way with the breakdown of mercantile capitalism in the late Middle Ages and was aided by the Industrial Revolution in the modern period. The Industrial Revolution arises in economic history, industrial capitalism in business history.

* * *

Why did the Industrial Revolution begin in England and not in France, which was well developed industrially?

Probably because the expanding British Empire gave to the business men of England a chance to trade profitably. The most profitable trade being in manufactured wares, the business men of England demanded more and more manufactures which petty capitalists ingeniously contrived to make in large quantities by power machinery. The English having little aptitude for luxury production, thus differing from the French, could turn successfully to the production of cottons, woolens, and iron and steel wares.

* * *

What have been the most successful American banks?

Consider the Chemical and the First National, both of New York City. The criterion of success in these instances is profit to the stockholders.

Why is property treated so ruthlessly by legislators in America?

Probably because it has been so easy for the individual who has lost his capital to get started again. Consider the failure to indemnify slave-owners at the time of emancipation and brewers and distillers in the experiment with prohibition.

* * *

What has changed the attitude of business men to war?

Once there was a reasonable expectation of gain; now the chances are that there will be a loss either of profits or of the profit system. A completely satisfactory answer would require the consideration of different classes of business men.

* * *

How could Calvinism, which emphasized salvation by faith rather than by works, mean so much to modern business?

Because *in practice* it was work that the followers of Calvin actually emphasized; that is, idleness was a danger and wealth was an indication of virtue. * * *

Why have Scots been so esteemed the world over in business of all kinds but especially in banking and positions of trust?

Well, is it a puritanic religion (Calvinism) or is it the stern training that comes from scratching a living out of rocky soil? Does Presbyterianism merely reflect what the Scotsman has long been? * * *

What are the oldest extant business records?

Babylonian cuneiform tablets of about 2,000 years before Christ record rents and sales of products. Mediæval manorial records of the thirteenth and following centuries provide detailed information about crops and rents. Medici account books record trade, industry, and banking from the fourteenth century onward.

* * *

Why has business history been so long in getting under way as a field of study?

The studies that are most remote from reality have historically been the first to be considered, largely to help in understanding man's position in the universe, and in relation to the deity. Economists have themselves been academicians for the most part and concerned more with logic than with facts. Historians have not had business records available for study nor have they been trained to use them.

N. S. B. Gras,
Harvard University.